

NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY
BIO 255 – BIOINFORMATICS AND COMPUTER APPLICATIONS IN BIOTECHNOLOGY (2 CR.)

Course Description

Covers basic computer concepts and Internet skills and uses a software suite, which includes word processing, spreadsheet, database, and presentation software to demonstrate skills. Introduces students to basic online tools and resources to retrieve and analyze biological data, such as DNA, RNA, and protein sequences, structures, functions, pathways, and interactions. Includes hands-on sessions to allow students to become familiar with these resources and their navigation and applications. Lecture 2 hours a week.

General Course Purpose

This course is designed to prepare students to be successful entry level laboratory technicians by teaching and reinforcing their computer skills, including the navigation and adept use of biological information databases. Computer skills are requisite in most of the upcoming careers in the knowledge based economy, and this course is designed to equip students with the skills necessary to use office management programs, send netiquette appropriate emails, and use the online bioinformatics databases and tools to mine for information relevant to biotechnology.

Course Prerequisites/Corequisites

Prerequisite: Program placed, BIO 250 and BIO 253 with a “C” or better, or biotechnology program head permission

Course Objectives

Upon completing the course, the student will be able to:

- Effectively use word-processing, spreadsheet, presentation, and email software tools
- Identify and navigate important biological databases
- Use appropriate tools for searching and analyzing biological data (FASTA, BLAST, CLUSTALW, etc.)
- Prepare a phylogenetic analysis using a computer program
- Use a basic protein folding program

Major Topics to be Included

Productivity Tools

Word Processing

- Use the Help system
- Perform basic editing, text formatting, move, copy, and cut and paste functions
- Use essential save and backup options
- Use print functions
- Create headers and footers
- Use document identification features such as embedded date, time and pagination in headers and/or footers
- Use document style features such as font styles, sizes, colors, margins, alignment, and indentation
- Use document context manipulation functions, such as find, search and replace, spell checker, and a grammarian

Spreadsheets

- Perform basic editing, data entry, move, copy, and cut and paste functions
- Perform basic insertion, deletion and modifications to at the sheet/workbook level
- Create, and use formulas
- Use basic, built-in spreadsheet functions
- Use essential formatting features, including data type, color, alignment, shading, and font characteristics.
- Use print functions

- Perform basic data representation using graphs and charts

Presentation Graphics

- Describe use of presentations, including discussion on appropriate data display techniques.
- Create and manipulate simple slide shows with outlines and notes.
- Create slide presentation that includes text, graphics, animation, and transitions.
- Use design layouts and templates for presentations

Email

- Understand basic components in email systems
- Compose a netiquette appropriate email
- Attach documents, photos, etc. to an email
- Archive email

Bioinformatics Tools

- Describe the various bioinformatics databases available from NCBI and other selected websites and determine what type of data is contained in each one
- Navigate the bioinformatics databases
- Use of tools for data mining and analysis including, but not limited to BLAST, FASTA, CLUSTALW, MeSH and phylogenetic tree building programs
- Basic use of Fold It or other protein folding program to study 3-D structures of protein sequences
- Problem based learning exercises using real world data for database navigation and analysis